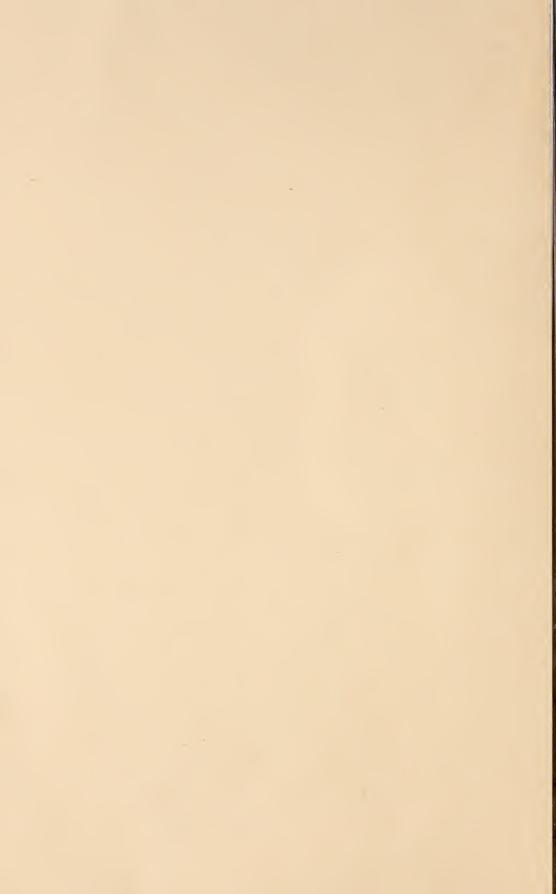
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U.S. DEPARTMENT OF ASSIGNATIONS

Report of the Chief of the Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, 1950

United States Department of Agriculture, Washington, D. C., September 15, 1950.

DR. P. V. CARDON,

Agricultural Research Administrator.

DEAR DR. CARDON: I submit herewith the report of the Bureau of Human Nutrition and Home Economics for the fiscal year ended June 30, 1950.

Sincerely,

HAZEL K. STIEBELING, Chief.

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INTRODUCTION

Research focused on consumer requirements and geared to helping solve problems of the home has been the function of the Bureau since its establishment more than a quarter century ago. Basic to guidance for both producers and consumers are the Bureau's studies of what people need and want, what various products and services can contribute toward satisfying these needs, and what people now consume as compared with what they might well use.

The Research and Marketing Act of 1946 gave new impetus to this research for consumers and the home. Among other things, the Act specifically authorizes studies in—

The efficient use of farm products;

Problems of human nutrition and the nutritive value of agri-

cultural commodities;

The design, development, and more satisfactory use of farm homes, including the application of electricity and other forms of power;

The improvement of the rural home and rural life; and

Ways to promote agriculture's maximum contribution to the

welfare of the consumer.

Hence, RMA funds allotted by the Secretary of Agriculture have enabled the Bureau to accelerate its research on the use of agricultural products for food, clothing, and other household purposes and on rural

living problems such as household buying and housing.

To carry on this expanded program, the Bureau has collaborated with other research groups in the Department of Agriculture and with regional and State organizations, taking advantage of existing know-how and facilities throughout the country. In 1950, more than a third of the Bureau's projects were carried on jointly with home economics units of colleges and universities or agricultural experiment stations. In conducting this work, 85 members of the Bureau staff were stationed in 24 States. Other research was initiated by the Bureau during the year under contracts with 13 institutions. Although findings from these new researches are not yet ready to report, they give promise of wide usefulness—to both farm and nonfarm groups.

The results of Bureau researches are put to work in various ways. Some kinds of information are most effective when incorporated into educational programs, influencing selection and use of products and services. Other kinds are most valuable when put into the hands of producers or marketing specialists, enabling them to place on the market goods and services closely adapted to consumer needs and

wants.

Hence Bureau findings are channeled to the public through many avenues: The Extension Service, the teaching branch of the Department; schools and colleges; scientific and trade journals; press, magazines, radio, and television; and conferences, as well as correspondence, with individuals who request information directly.

During the past year the Bureau published or submitted for

printing—

81 printed and processed publications

36 technical articles for professional journals

37 popular articles

103 press releases, press picture series, and press statements

Distribution of the more than 100 popular and technical bulletins currently in circulation totaled over 7,000,000 copies.

A new motion picture embodying clothing research of the Bureau was completed and placed in film depositories in most of the States.

The Bureau also participated in 19 television programs, cooperated in the preparation of a movie short for television use and took part in 14 radio programs most of which were on Nation-wide networks.

The following pages record some of the research advanced in the

past year.

HOUSEHOLD UTILIZATION OF FOOD

Family Fare

Concisely bringing together up-to-date information for homemakers on nutrition, meal planning, and food buying, storing, and cooking, the Bureau early in 1950 issued Family Fare—Food Management and Recipes, Home and Garden Bulletin No. 1. This 100-page bulletin includes material not previously published by the Bureau and provides reference information frequently wanted by family meal planners and cooks, such as ways to substitute one ingredient for another, servings per pound of different foods, and guidance on nutritive values of different foods.

Family Fare replaces Aunt Sammy's Radio Recipes, issued nearly 20 years ago by the Bureau and long a governmental "best seller." Covering a much broader field, Family Fare includes more than 200 recipes and provides menus for meals planned around 60 of the maindish recipes. Like recipes in other Bureau publications, those for this booklet were developed or adapted in the Bureau's laboratory kitchens following strict experimental procedure and were rated on such points of eating quality as flavor, texture, and color by judging panels from the laboratory staff.

Poultry and Meat Cooking

A booklet on cooking turkey entitled "Turkey on the Table the Year Round" was timed for the marketing of the plentiful 1949–50 turkey crop. Distributed widely to homemakers, the publication includes cooking procedures for turkey parts and steaks, new on the market. These pieces provide turkey in a size suitable for small families and are offered at retail as an additional way of marketing the large supply of big turkeys.

New findings are becoming available on the yield of cooked poultry and meat. Cooked yield is the homemaker's most specific guide on how much meat or poultry to buy and what cooking methods are most economical. Quantity buyers of poultry and meat, who can make savings on a larger scale, are especially benefited by yield figures, which enable them to calculate servings more closely. The yields of their product in the home concern growers and marketers too, in planning how much to produce and when to market.

Data have been published on yield of cooked edible portion of poultry and various meats cooked by boiling, simmering, roasting, braising, and frying. The yields of cooked muscle obtained from pork chops, beef chuck, and stewing hens ranged from 33 to 39 percent of ready-to-cook weight, bone in. Roasting chickens gave larger yields than stewing hens in proportion to ready-to-cook weight, bone in.

In a comparison of roasted young Beltsville Small White and Broad Breasted Bronze turkeys—both sexes—Beltsville Small White female turkeys produced the highest average yield of cooked edible portion (total muscle, giblets, and skin with fat)—namely 53 percent of New York dressed weight. The yield from the other turkeys was 47–48 percent.

Dry Milk

To give homemakers information on using dry milk products, whole and nonfat, results of the Bureau's experimental cookery with these products were put into a 32-page leaflet. Directions for use were especially needed because dry milk had recently become generally available in consumer-size packages. The leaflet includes more than 50 recipes containing dry milk, provides information on nutritive value and storing, and gives general directions for using this product in cooking.

Evaporated Apples

To widen the usefulness of a modern apple product unfamiliar to many homemakers, a small segment of work was concerned with evaporated apple rings—fresh tasting and easy to prepare. Research showed that much of the success of evaporated apple ring recipes depends on using for each recipe the right method of restoring water to the apples. Results of this study have been made available to the trade and have also been published in a leaflet with general cooking directions and 20 recipes for homemakers.

Home Canning

For many years, it was necessary to rely heavily on research pertaining to commercial processing in providing directions for home canning. When commercial processes were applied to home conditions, heating times were usually increased to provide a wide margin of added safety. But when the Bureau several years ago began systematic research on canning methods using household equipment, it succeeded in developing improved directions that call for less severe heating, thus combining adequate safety with better-tasting and more nourishing home-canned products.

Working toward still better home-canned products, canning specialists are studying ways to further reduce the heating necessary to destroy spoilage organisms that attack canned foods. Current research is adding to knowledge on the heat resistance of these organisms

and on the heat treatments necessary in different foods.

Canning procedures for meats and most vegetables have been based on heat requirements to destroy a standard test organism (spore suspension of putrefactive anaerobe No. 3679) in a chemical solution, neutral phosphate buffer. There is evidence, however, that the heat treatments required to destroy spoilage organisms are different in foods than in phosphate buffer and that they vary from food to food. Hence a systematic study has been made, using 13 vegetables and 2 meats, to establish thermal-death time curves characteristic of spores in various food products. About 2,500 test cans have been packed, inoculated, and processed in establishing the data. The work has involved observations on the survival of heated spores as indicated by their ability to germinate and grow both in the food in which they were heated and after subculturing.

The explanation for variations in resistance of spores when heated in different kinds of food is not altogether clear, but there is evidence that certain vitamins which occur naturally in foods and certain chemically related synthetic products can alter the heat resistance of bacterial spores. It was found that by adding 0.01 percent of vitamin K_5 to the neutral phosphate buffer in which spores of bacteria causing spoilage were heated, the time required at 115° C. to destroy the spores could be reduced from 25 to 12 minutes. Para-aminobenzoic acid and thiamine in similar concentrations also reduced somewhat the resistance of spoilage organisms to heat. On the other hand, such organisms became more resistant to heat when ascorbic acid or calcium pantothenate was added.

Taste-Testing in Food Research

At present the most satisfactory way to test foods for such qualities as flavor and texture is to serve samples to expert judges and to compare verdicts. This is done in most food research laboratories and is an important technique in developing new food products and

improving old ones.

But because taste testing is conducted in so many different ways, one laboratory often cannot compare its findings with those of others. To work toward uniform methods of selecting food judges, preparing food samples, setting up rating scales, and analyzing results, a 3-day conference of scientists from all parts of the country was arranged by the Bureau. The 71 men and women who attended included home economists, food technologists, chemists, biologists, horticulturists, and statisticians.

In preparation for the conference, Bureau personnel made a comprehensive review of 350 bulletins and journal articles on procedures for testing food by sensory methods. This information was summarized in an 83-page processed publication for the use of conference

participants.

Following the discussion sessions, conference committees prepared reports, citing techniques considered desirable and making recommendations for needed research. The Bureau staff later prepared a mimeographed report of the recorded proceedings and committee statements which will be published after clearance with conference participants.

INSTITUTIONAL USES OF FOOD

An increasing number of people are eating meals outside the home in cafeterias, restaurants, institutions, and schools so that more food is being prepared on a larger scale in this country. Institutional feeding not only calls for individual dishes that are palatable and nutritious but, when meals are served without choice, there is need for nutritionally sound meal planning.

Food Plans for Institutional Use

Nutritionally adequate food plans at low- and moderate-cost levels have been developed to help food managers of institutions maintain high standards. These plans are based on an analysis of the kinds and quantities of food now used by institutions of various types modified for nutritional requirements, nutritive values of food, and food prices. The plans are suitable for children's homes, dormitories, and other institutions where the resident population is fairly con-

stant and food needs are normal. The food quantities are given for 10 persons for 1 month; from these basic units plans may be developed

for both large and small institutions.

These food plans are being prepared for publication with directions for their use, guides to help in planning attractive and well-balanced menus, simple forms for cost accounting, and tables containing purchase information for about 200 foods.

Quantity Service Recipes Using Abundant Foods

Following recommendations of the Department's commodity advisory committees and stimulated by the interest of the National Restaurant Association, the American Hospital Association, and college food-service managers, quantity recipes using abundant foods are being developed. In the fall and winter of 1949–50 the plentiful foods used included fresh and canned peaches, apples, tomatoes, cranberries,

potatoes, sweetpotatoes, turkey, and pork.

Recipes for these foods in sizes to serve 25, 50, and 100 were originated and tested in the Bureau's laboratories and the products judged and approved by a panel of food specialists and home economists. Through arrangements with the National Restaurant Association, the recipes were also tested by the Association's testing committees in Chicago, San Francisco, Los Angeles, and Washington, D. C., and by a college food service department. Consumer acceptance tests were also made in the Department of Agriculture cafeterias.

The first issue of Recipes for Quantity Service, including 11 recipes, has been published. Other recipes will be released from time to time. The National Restaurant Association plans to reissue them for dis-

tribution to its 16,000 members.

School Lunch Management

Several types of studies indicate the need for continuous attention to recipes, menu planning, good cooking, and careful general management if a school is to serve economical, attractive, nutritious meals that

will have high pupil acceptance.

To learn how well meals served at school are meeting the desirable level of providing one-third or more of a child's daily needs for vitamins, protein, and other nutrients, plate lunches taken from the cafeteria line were analyzed chemically. A total of 70 meals was analyzed from 15 schools in the District of Columbia, Maryland, West Virginia, New Jersey, Iowa, Kansas, and Ohio.

The lunches studied provided for pupils' dietary needs in most respects. Vitamin C (ascorbic acid) was short in lunches lacking some form of citrus fruit. Thirty-two of the seventy meals had enough vitamin C; they supplied at least 25 milligrams, or one-third of the recommended daily allowance of this vitamin. But thiamine was

below desired levels in two-thirds of the cases.

The study provided new evidence that children who refuse milk as a beverage deny themselves an important food. Without milk as a beverage, 55 of the 70 meals would have been below recommended levels of protein, 60 below in riboflavin, and 69 below in calcium. With milk, the needs for these nutrients were fully met by the meals provided.

A bulletin prepared this year reports a study of management practices in 39 schools in 16 different States, and indicates problems existing and successes achieved under different conditions in serving acceptable nutritious meals at low or moderate cost.

NUTRITIONAL STATUS AS AFFECTED BY DIET

Under the Research and Marketing Act, funds "to conduct and to stimulate * * * research into the problems of human nutrition * * *" allotted to this Bureau and to State agricultural experiment stations have been pooled with other Federal, State, and local resources in a cooperative effort to obtain better information on

the nutritional status and food needs of people.

The broad plan of much of the current work is to select distinctive population groups for study, to characterize the nutritional status of each subject both by physical measures (medical, dental, and/or X-ray) and by appropriate biochemical studies of body fluids, to describe the customary diet in terms of actual foods or nutrients, to observe intake and output of food and nutrients, and to ascertain relationships so far as possible. The results are expected to show the food choices and the quantities of nutrients that support different levels of nutritional health of persons of various ages under different environmental conditions.

In Oregon, for example, study has been centered on boys and girls 14 to 16 years of age who were born and reared in either a coastal or a central section of the State, in areas selected because of existing marked difference in incidence of dental caries. In California, study centered on diet in relation to nutritional health of persons 50 years of age and over; in Colorado, of teen-aged and middle-aged persons at two altitude levels; in Arizona, of teen-aged children on the Papago Indian Reservation; and in New Mexico, of teen-age Spanish-American children. In the North Central States studies are concerned with diet in relation to nutritional status of women in various decades

of life past 30 and with elementary school children.

From these studies, planned by regional groups of scientists, first reports are emerging and some consistent findings are appearing. Among most population groups clinically observable signs and symptoms of nutritional deficiency seldom exist to a marked degree, except for dental caries. Hemoglobin levels differ widely among age groups and in different parts of the country. Biochemical measures for serum ascorbic acid and serum carotene reflect levels of dietary intake, whereas those for serum vitamin A apparently do not. The first two constituents are less often related to physical findings than would be expected. Adolescents tend to have poorer diets than do grade-school children, and girls poorer diets and lower nutritional ratings than boys.

Because studies of nutritional status are costly, involving the knowledge and skills of many professional groups, much attention is being given by research workers to pooling experiences and unpublished results in an effort to find more rapid and short-cut methods of assessing nutritional status, and to eliminate procedures and measurements likely to prove unfruitful. In this connection, the Bureau has given leadership in two workshops for training in new biochemical techniques and in a conference on methods of collecting and apprais-

ing dietary data.

The Bureau has prepared food composition tables suited to the needs of the nutritional status studies, and will make available to cooperating States copies of a master set of machine punch cards for rapid calculation of diets. The Bureau is also sharing its experience obtained in collecting and analyzing data in an exploratory study of the nutritional status of children with and without school lunch made cooperatively with the United States Public Health Service. Currently being developed is a standardized basal diet for use in cooperative laboratory studies of human needs for specific nutrients.

NUTRITIVE VALUE OF FOOD

Interest in food composition has been heightened in the past five years as a result both of the discovery of new nutritional roles for the better known nutrients and the identification of nutrients heretofore unknown. The demand for information on their distribution in foods has far outrun the development of reliable methods for assays.

The Bureau's program calls for keeping up-to-date food composition tables in the hands of workers—nutritionists, dietitians, economists, procurement agencies, physicians, teachers, textbook writers, and others who depend on them; for compiling data on new nutrients and issuing tables as rapidly as the research reported will justify; and for systematic laboratory analyses of the nutrient content of foods as purchased and as eaten, especially for those nutrients on which data are important and lacking.

Food Composition Tables

Recently issued is a publication giving three tables of food values, designed for persons who wish to evaluate food supplies and diets in terms of well-known nutrients and to appraise the relative value and

economy of different foods.

Nutritive value data for about 750 items of food are presented for 100-gram edible portion, for 1 pound as purchased, and for common household units such as 1 cup. Many of the figures in these tables apply to food as eaten—cooked meats and cooked vegetables—information not heretofore summarized but greatly needed in appraising the nutritive value of diets of individuals or of families. The new tables also contain revised calorie values for many foods.

Laboratory Analyses of Foods as Purchased and as Eaten

Just completed also is a compilation of new data from Bureau laboratories, contract research, and the literature on the folic acid content of foods. The Bureau has analyzed over 140 foods for folic acid, a recently discovered B vitamin for which adequate data have not been available. Results show that within each food group some foods are outstandingly better sources of this nutrient than other foods.

Among the green succulent vegetables, asparagus and spinach were found to rank highest, around 14 gamma of folic acid per gram of dry weight; many green leaves (turnip, chard, beet, kale, chicory, and one variety of lettuce) contained 5 to 10 gamma. Other vegetables furnishing about 2 or more gamma per gram were green beans, broccoli, Chi-

nese cabbage, cauliflower, cucumbers, lettuce, mushrooms, black-eye

peas, and soybeans.

All fruits analyzed contained less than 2 gamma per gram of dry weight. Best sources among the fruits were avocados and blackberries; in a second class came blueberries, strawberries, cantaloups, honeydew melons, and tangerines. Cereals and meats ranked low in their content of folic acid.

Also in process are analyses to obtain data on amino acids, fatty

acids, and pantothenic acid in a wide variety of foods.

FAMILY FOOD CONSUMPTION

New findings about what families eat, the nutritive value of their diets, and family use of specific foods have been published during the year in 18 additional reports on family food consumption surveys conducted under the Research and Marketing Act. The surveys, which covered 4,500 families in some 70 cities throughout the United States, provide a basis for estimating potential outlets for food and a basis for educational and other programs to expand consumption and improve nutrition. The reports are in demand by producer and trade groups, economists in research and teaching, and administrators in

program planning, as well as by educators and nutritionists.

An encouraging trend which the surveys reveal is that in 1948, compared with 1942, most improvement in nutritive value of diets was in the population sector of greatest need—among families in the lowest third of income. This does not mean, however, that diets of all families at other income levels are satisfactory. Among families with incomes over \$7,500, nearly 40 percent had less calcium, 25 percent had less thiamine, and 10 to 15 percent had less iron, riboffavin, and niacin than current nutritional knowledge suggests as desirable. It would appear that many families who can well afford the best diets are making choices which in the long run may not support the highest health.

While three of the reports deal specifically with the nutritive value of family diets, several others give detailed information on family consumption of some 200 food items in 15 major food groups. Some of the reports show variation by region of the country and by season.

Ten of the new reports deal with specific commodities and are of special concern to the food industry and market analysts. Separate reports cover dairy products, meats, eggs and poultry, fats and oils, grain products, sugars and sweets, potatoes and sweetpotatoes, other vegetables, citrus fruit, and other fruits. Among the significant find-

ings on these food groups are—

Meat took the largest part of the food dollar spent by city families in the spring of 1948, with dairy products a close second. Families spent about one-fourth of their food dollars for meat. Beef, the most popular meat, was used in 88 percent of the households during the survey week. Pork was a close second, followed by veal and lamb. Fish was used in 57 percent of the households during the week. Although meats, poultry, and fish took 27 percent of the urban family food budget, they furnished 29 percent of the protein and 44 percent of the niacin.

Almost a fifth of the food dollars went for dairy products, with outlay for fresh whole milk representing half of this amount. Not counting butter, dairy products took nearly 16 percent of the family food budget but gave high returns-24 percent of the protein in the diets, 66 percent of the calcium, 42 percent of the riboflavin, plus 10 to

15 percent of the food energy, vitamin A value, and thiamine.

Seven cents of each food dollar went for table fats, lard, shortening, cooking and salad oils, mayonnaise, and salad dressings. A shift in food habits is shown by a decrease in the proportion of families buying butter during a week from 87 percent in 1942 to 67 percent in 1948 and an increase in the proportion of those buying margarine from 16

to 51 percent.

In the spring of the year, 3 cents of each food dollar went for citrus fruit compared with 17 cents for all fruit and vegetables together. the money spent for fruit, families put 69 percent into fresh fruits, 27 percent into canned fruits and fruit juices, and the remainder into dried and frozen fruits. Most frequently selected fresh fruits other than citrus were bananas, apples, and strawberries. Peaches and apples were the most often purchased canned fruits.

Two cents of the family food dollar went for potatoes and sweet-potatoes and 9 cents for other vegetables.

Frozen fruit and vegetable consumption was most affected by income among the groups of foods examined. Fresh fruits ranked next in the percentage by which consumption in high-income groups exceeded that in low-income groups. Dairy products, fresh vegetables, and canned fruits, vegetables, and juices followed next in line. Average consumption of some groups of foods, such as potatoes and grain products, was somewhat less for the high- than for the low-income families.

UTILIZATION OF TEXTILE PRODUCTS

Dimensional Stability of Knitted Fabrics

Lightweight knitted cotton garments, particularly knit underwear and sweaters for children, are often unwearable after one or two washings; for these knit garments tend to shrink lengthwise and to stretch

crosswise after laundering.

In an effort to determine the cause of such distortion in commonly used knit fabrics, the Bureau in cooperation with the Underwear Institute conducted an exploratory study of the effect of washing procedures upon the dimensional stability of knitted fabrics differing in construc-These included plain knit and 1 by 1 rib cotton and wool under-

wear fabrics having 24 to 40 courses per inch.

The number of courses in an inch of fabric was found to play an important part in the dimensional changes of material of this type when laundered. The Bureau's experiments indicate that shrinkage in length and stretching in width, which occur when jersey knit fabrics are laundered, can be substantially reduced by increasing the number of courses up to 34 per inch for wool rib fabrics and up to 40 per inch for plain and rib cotton fabrics.

Functional Clothing for Women and Children

Protective outdoor garments were originated for women and children to show how functional design combined with appropriate fabrics can contribute to efficiency in performing certain tasks.

An all-weather shopping outfit for women consists of a coat, hood, and carry-all which supports a bag of groceries without strain. The fabric in coat and hood is a newly developed twill cotton coating with

shower- and wrinkle-resistant finishes.

Rain outfits for women and children were developed also in light-weight shower-resistant cottons. These are suited to the specific need of using rainwear over other wraps, and permit ventilation essential to comfort. Clear vision, protective coloring, and reflecting trim for protection after dark are safety features worked into these garments.

Patterns for home sewers have been provided through cooperation with commercial companies. Approximately 100 manufacturers of rainwear and accessories have indicated interest in manufacturing

these functional designs in ready-to-wear.

One printed leaflet and two one-page processed fliers have been released to the public and a 4½-minute motion picture featuring the shopping outfit was prepared.

Sizing Clothing for Women and Girls

Prevailing lack of uniformity in sizing, large number of garment returns to stores, and the high cost of alterations are some of the problems creating a need for improved sizing of women's and chil-

dren's apparel.

In connection with the clothing industry's efforts in this direction, the Bureau has continued to provide data from its study of body measurements made in 1937–38. The Bureau has cooperated with the Statistical Engineering Laboratory of the National Bureau of Standards in making special analyses of figures on body measurements of girls 11 to 16 years of age. On the basis of these analyses a system of sizing apparel for subteen- and teen-age girls has been proposed. For each of the 7 size intervals suggested for adolescent girls, 20 basic measurements were determined. These have been incorporated by the Commodity Standards Division of the cooperating agency in a tentative commercial standard now being circulated to the industry for comment.

Similar analyses of the Bureau's figures on the body measurements of adult women are well under way.

Clothing Construction

A natural color motion picture with narration sound track, Truly Yours—the Dress That Fits, shows fitting points to check when buying ready-made dresses and demonstrates how some of the most common alterations may be made successfully at home by women who sew. The film is especially designed for extension workers, teachers, and women's groups. The film, completed this past year, is available for loan from State film libraries.

At the request of the Department's Office of Information and the Extension Service, the Bureau participated in the Department's current project to determine possibilities of television as an outlet for research findings. Two clothing specialists prepared and presented 15 programs demonstrating how to make a dress—from the selection

of fabric and pattern to the final pressing.

Standards for Clothing Construction

With the Consumer Interests Committee of the American Home Economics Association, the Bureau shared in developing a proposed AHEA standard for materials and construction of house dresses. The construction phases of the standard were based largely on research by the Bureau. Suggestions were incorporated from committee members, from manufacturers of house dresses, and from experts in preparing specifications and in checking articles made according to specifications. The revised standard has been approved by the Consumer Interests Committee and the executive board of the American Home Economics Association, and will be released to manufacturers, retailers, and consumers.

FARM FAMILY LIVING

Analyzing adjustments that farm families make to changes in income is an annual responsibility of the Bureau in preparation for the Department's Agricultural Outlook Conference, conducted jointly each year by the Extension Service, Bureau of Agricultural Economics, and BHNHE. Timely evidence on these adjustments, always useful to home economists of the Extension Service, had special significance this year because of 1949's decreased farm income.

Among the major sources of data on farm family spending are accounts kept by farm families in a number of States. Progress was made during the year on a project cooperative with the University of Illinois designed to make possible broader use of the data from these accounts. Findings of the project show that while account-keeping families are not representative of the entire farm population, the differences can be measured, making possible statistical interpretation of the farm home accounts.

Surveys are another important source of information on farm family spending and levels of living. Some findings from a recent study made among farm-operator families of selected types in four Kansas counties were released for use at the October 1949 conference.

Materials prepared for the conference, including charts presenting economic and social data, were widely circulated and reviewed in trade

and professional journals.

Reporting of information on family living was continued throughout the year in four special releases to home economists in the Extension Service and in colleges. Special attention was given during the year to revising the content and form of these releases to take account of the reaction of readers and how they use the material, determined by a survey made in cooperation with the Extension Service.

HOUSING

Financing House Improvements

Many farm families interested in remodeling and modernizing their houses are seeking credit for financing such improvements. A new Bureau publication, Using Credit to Finance Farmhouse Improvements, calls attention to financial considerations which a family should not overlook and includes suggestions that are important whether financing with credit or cash. Experiences in financing housing improvements reported by a group of families in the North

Central States were an important source of information used by the Bureau in preparing this publication. The bulletin was written primarily for extension agents, teachers, and others who work with farm families to help them plan for individual circumstances.

Better Farmhouses

Detailed knowledge is coming to light concerning the Nation's present farm housing, what farm families need in a home, and what they would like to have, as a result of surveys now nearing completion. During the past 3 years, approximately 4,000 rural families in 42 States have been interviewed regarding their housing needs and preferences. Undertaken with funds provided by the Research and Marketing Act of 1946, the surveys are a joint research task of the Bureau and 29 State agricultural experiment stations. Findings of the surveys are being published for each of four regions, but to date

only the Northeast survey results are in print.

Farm family preferences for certain features in house design and for location of household activities are among the findings which architects and home planners can put to use immediately. Designers of houses for the Northeast will be guided by the fact that about 34 percent of the families questioned in that region preferred a one-story house although only about 3 percent live in such homes now. They also will be concerned with such other findings as that most families want a basement and central heating, three-fourths of the families want a front porch, and that half of the families desire more storage space than they now have.

Another phase of the study provides the basis for laboratory work which will lead to the development of space standards for storage and household activities and to recommendations for arranging space and equipment. The quantities of clothing, food, dishes, linens, and household supplies which families reported they have on hand will be useful in developing space standards for storage. Decisions as to which household activities should have space specially designed for them will be based on such findings as the percentage of families which do their own washing, baking, canning, and home sewing and how fre-

quently these activities are performed.

The regional report on the North Central States is now in press and the southern and western reports are in preparation. Because of the urgent need in the farm housing program, preliminary data for these regions are being made available to architects and research workers.

Low-Cost Farmhouses

Plans for low-cost farmhouses for use in connection with the loan program under the Housing Act of 1949 are being prepared jointly by the Bureau of Human Nutrition and Home Economics and the Bureau of Plant Industry, Soils, and Agricultural Engineering. Immediately upon passage of the act, these Bureaus, with the Extension Service and the Farmers Home Administration, held a series of 2-day meetings in six geographic areas to enlist the cooperation of the State agricultural colleges and to reach agreement on the minimum requirements for the houses to be planned. These meetings were held in Atlanta, Ga., Knoxville, Tenn., Portland, Oreg., Los Angeles, Calif.,

Chicago, Ill., and State College, Pa. Most of the colleges sent agricultural engineering and home economics representatives from both

the State experiment station and the State extension service.

After the meetings, the space, functional, structural, and equipment requirements agreed upon for low-cost farmhouses for each geographic area were compiled and circulated to the conference participants for review. The approved requirements are being issued as guides for the use of architects preparing plans under this program. They also will be used by the field staffs of the Farmers Home Administration and the Extension Service.

The directors of the experiment stations and of the extension services have been asked to appoint committees in each State composed of home economists, agricultural engineers, and a State representative of the Farmers Home Administration to review preliminary drawings of

plans being prepared for use in that area.

In the laboratories at the Agricultural Research Center and in the cooperating States, preparation of plans for low-cost houses is under way. At the Agricultural Research Center revision has been completed of four existing plans, selected at the Atlanta and Knoxville meetings. A leaflet illustrating these plans has been issued and working drawings have been made available. Work is also under way on a group of small low-cost houses which can later be enlarged as family living needs change. At the request of the Farmers Home Administration, completely revised drawings have been made for three plans formerly used by that agency and work is well under way on a fourth. These will be available to borrowers through local Farmers Home Administration offices.

HOUSEHOLD EQUIPMENT

Kitchen Utensils

In response to numerous requests for help in evaluating the many types of pots and pans on the market, a bulletin dealing with cooking utensils was prepared. It describes the characteristics of the various materials used in cooking utensils, discusses design and construction features, and gives pointers on care. The bulletin deals primarily with utensils needed in a minimum and a more desirable set for cooking family meals, as determined by a Bureau study in cooperation with California, Nebraska, and Rhode Island. The bulletin is designed as a buying guide for homemakers, but it will be useful also to extension leaders, teachers, and others concerned with consumer education.

Food Storage Capacity of Home Freezers

Lack of agreement in published estimates of the quantity of frozen food that can be stored in home freezers of different dimensions led the Bureau to look into the question. Seven types of storage space were studied—one cylindrical, one cubical, and five rectangular. Five fruits and seven vegetables were packaged in one or more of seven types of containers.

The type of container used was found to have more effect on the quantity of food that can be packed into a freezer than the shape of the freezer spaces, even though the containers hold about the same weight of food per cubic inch. Rectangular containers—small ones or a well-

planned combination of large and small—utilize the space to better

advantage than any other type.

The results of this study show the need for an accurate common method of rating freezer storage capacities. Because of the wide variation in weights of food per unit volume, a more reliable estimate of the storage capacity of a freezer or locker space can be obtained in terms of volume than in terms of weight. The dimensions and shapes of the so-called pint, quart, and 2-quart containers might well be standardized so that it would be possible to rate storage capacity in terms of the number of pints or quarts per cubic foot. This would give a basis for comparing storage capacities of different freezers, as well as one for estimating the size of freezer a family may need.

Desirable storage capacity in home freezers

Estimates of freezer capacity needed by farm families have varied from 5 to 15 cubic feet per person. Consequently, the Bureau has formulated tables to enable families to find as readily and simply as possible the freezer size that applies to their own needs.

OTHER SERVICES IN NUTRITION AND HOME ECONOMICS

The Secretary of Agriculture, in August 1949, transferred to the Bureau the Department's responsibility "for coordinating nutrition services made available by Federal, State, and other agencies." During the past year the Bureau has cooperated in the coordination of information on nutrition and home economics in a number of ways. These include serving as a secretariat to the Interagency Committee on Nutrition Education and School Lunch; publication of a monthly newsletter for nutrition committees, reporting activities of State and Federal groups and stimulating continued interest in this cooperative effort; and giving assistance to regional extension and other groups

in programs for nutrition and school lunch workshops.

As a service to consumer educators, a series of releases designed as informational source materials on foods and their values was initiated. Sections of the technical reports on nutrition and family economics were prepared for use by the Midcentury White House Conference on Children and Youth. Assistance was given to the staff of the Joint Committee on the Economic Report of the Eighty-first Congress. The Subcommittee on Low-Income Families requested material on food consumption of city families and expenditures of farm families. Compiled and published were titles of graduate theses in child development in the past 20 years, in home economics education in the past 5 years (in cooperation with the Office of Education), and in technical areas of home economics in the past year.

The Bureau also has taken leadership among Government agencies in developing statements on nutrition and other documents as part of this country's reporting to the Food and Agriculture Organization of the United Nations. The chief of the Bureau is a member of the Joint Advisory Committee on Nutrition to FAO and WHO, and served as a member of the United States delegation to the Fifth Annual FAO Conference held in November 1949 and as head of the United States delegation to the regional nutrition conference held in

Rio de Janeiro in June 1950.

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